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TRANSLATIONS ON ENVIRONMENTAL QUALITY

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## EAST GERMANY

### FRG PAPER ON GDR NUCLEAR POWER PROGRAM, PROTECTION POLICY

Frankfurt/Main FRANKFURTER ALLGEMEINE in German 2 Apr 77 p 12

[Article by Ullrich Ruehmland: "GDR Citizens Not Consulted About Construction of Reactors: No Public Announcement/USSR Takes Highly Radioactive Wastes"]

[Text] Two atomic power plants are operating in the GDR at the present time: Rheinsberg on Lake Stechlin since 1956 and Lubmin on Greifswald Bay since 1974. They are consolidated in the VEB Nuclear Power Plant "Bruno Leuschner." A third nuclear power plant is under construction in the Altmarkt (Brandenburg Bezirk). The most important equipment for the nuclear power plants is being delivered by the Soviet Union. Technically they are Leningrad and Novo-Voronezh type equipment.

The fuel requirements of a reactor for 1 year comes to 14 tons of uranium, and it is supplied by the Soviet Union. The power output of the North power plant in Lubmin is 3,520 kilowatts. The power plant under construction in the Altmarkt is said to have the same output after all the turbines are operative.

Atomic research is under the direct control of the Soviet Union. The Academy Central Institute of Rossendorf near Dresden, which was founded in 1955, is the largest atomic research institute of the GDR. In 1972 the institute received a cyclotron from the Duna Soviet Nuclear Research Center. The VEB Nuclear Energy is developing nuclear engineering facilities within the framework of the economic associations of the Council for Economic Mutual Assistance (CEMA), namely Interatomicinstrument and Interatomicenergy.

### Wismut Promotes Uranium

Since 1946 the mining of uranium has been carried out in the Vogtland and in the Erzgebirge by the Soviet-German Stock Company (SDAG) Wismut, with the main sites at Johanngeorgenstadt and in Thuringia around Ronnenburg. The amount of uranium ore mined annually comes to over 2,000 tons for U-238 ore. The uranium ore mined is enriched in the GDR. The concentrate must be shipped to the Soviet Union without exception. The GDR must buy back the isotopes for nuclear power plants from the Soviet Union.

Those dangers which have to do with the operation of atomic power plants, the utilization of nuclear energy materials, and the use, storage and transport of radioactive materials, are designated as atomic risk. Numerous regulations and orders resulted in the law governing the use of atomic energy of 1962. To these are added additional internal administrative rules of the Office of Atomic Energy and Radiation Protection.

According to the legal definition in the atomic energy law, radiation damage is "damage to health of a temporary or permanent nature or the advent of death resulting from the operation of nuclear plants or traffic with the spent materials." From 1969 to 1973 the protection and controls against radioactive radiation was the responsibility of the State Office for Radiation Protection, from which the Office for Atomic Safety [sic] and Radiation Protection was formed in 1973. The office is directly subordinate to the Council of Ministers and has its own administrative organization.

Among the tasks of the Office for Atomic Energy and Radiation Protection under its present president Prof Dr Sitzlack are the following: issuing permits for atomic power plants, to the exclusion of the State Construction Supervisor; issuing permits for atomic waste dumps; regulating the standard and critical values according to millirem; issuing permits for the use of nuclear material and for transport of nuclear material and for atomic waste; and inspecting atomic power plants.

There is no participation on the part of the people or communal bodies in the planning of atomic power plants. In contrast to the Federal Republic, there is no prior public announcement connected with the construction of atomic power plants and there is no hearing with an opportunity for complaints for those affected by the construction. Likewise there is no discussion with those concerned, either. It is not possible to telephone the administrative court, either, since in the GDR there is no administrative appeal mechanism serving the protection of individuals. Also, it is not possible to appeal the decision of the Office for Atomic Safety [sic] and Radiation Protection before a kreis court.

Citizens' initiatives may not protest against atomic power facilities. There are certainly citizens' initiatives in the GDR. However, they are organized and controlled within the framework of the movement "Beautify the Cities" and "Take Part" by the National Front (the chairman of residential sections are SED functionaries as a rule). Besides, the controlled and organized citizens' initiative exists only at the local level. Citizens' initiatives may not develop spontaneously by themselves since spontaneity is not compatible with Marxist legality.

The workers of the Inspectorate of the Office for Atomic Safety [sic] and Radiation Protection have extraordinary police powers in the atomic power plants, in research institutes and in the realm of the Wismut Stock Company. Thus, in case of something serious, they can sound a special disaster alert (since 1975, protection against disaster in the GDR has been a part of civil defense) through a special management body of the deployment staff in the

National Defense Council or of the responsible bezirk deployment staff, or in individual cases (in accordance with a radiation alert plan) they can close parts of the enterprises, evacuate persons, and concentrate persons in special camps. Within the confines of SDAG Wismut, the Office for Radiation Protection can, as an executive organ, bring in members of the Bezirk Office of the German People's Police for the SDAG jurisdiction.

The nuclear radiation disaster plan is aimed at three areas of disaster:

1. the so-called area exposed to radiation. It comprises the grounds of atomic power facilities, research institutes and enrichment plants with the "persons especially exposed to radiation" working there.
2. the surveillance area encompassing up to 7 kilometers with the "persons exposed to radiation" who work there, and
3. the danger zone: for atomic power plants it is up to 20 kilometers, and for transporting atomic waste for disposal it is up to 7 kilometers.

#### Storage in Magdeburg Salt Domes

Seven different classes of danger are distinguished for the transporting of radioactive waste. Details of the atomic alert plan of the Office for Radiation Protection are secret.

The inspectorates are provided with extensive special police powers. The members of the inspectorates receive their technical training in Dubna both at the School for Fire Officers of the People's Police in Heyrothsberge near Magdeburg and at the Officer's School for Civil Defense at Nardt/Lausitz. In addition, all workers receive special scientific training in progressive courses of instruction.

As prescribed by laws in force, three entities play a role in cases of liability claims: the Office for Atomic Safety [sic] and Radiation Protection, the director of the VEB Nuclear Power Plant "Bruno Leuschner" and legal entities for radioactive material (among them the SDAG Wismut).

The storage of atomic waste is of special importance within the framework of the disposal in atomic dumps. At the present time in the GDR, highly active wastes are being shipped to the Soviet Union. Weakly active wastes are being stored in abandoned, earthquake-proof salt domes of the Magdeburg flats.

So far the GDR has not announced officially whether any breakdowns have occurred in atomic power plants. Contradictory reports are heard about the emergency cooling facilities of the atomic power plant in the recreation area of Rheinsberg on Lake Stechlin: one thing is certain, however, that the exact measured values which are prescribed by the inspectorates for safe radiation limits for human beings outside atomic technical facilities are higher than in the Federal Republic. Thus the permissible amount of radiation for humans outside atomic technical structures in the GDR is 300 millirem, compared to 60 millirems in the Federal Republic.



EAST GERMANY

MINISTER INTERVIEWED ON INCREASED WATER CONSUMPTION PROBLEMS

East Berlin TRIBUENE in German 18 Mar 77 p 7

[Interview with Dr Hans Reichelt, deputy chairman of the Council of Ministers and minister for environmental protection and water management, by Herbert Bluhm]

[Text] Dr Hans Reichelt was born in Proskau in 1925. In 1949 he joined the Democratic Farmers Party of Germany. Since 1950 he has been a member of the Secretariat and the Presidium of the party directorate. Then followed: minister for agriculture, realization, and forestry (1953-1963); state examination as certified economist (1963/64); promotion to doctor of economics (1972). From 1963-1967 minister and deputy chairman of the Council for Agriculture and Food Production of the GDR; 1966-1972 chairman of the State Committee for Soil enrichment. On March 9, 1972, Dr Hans Reichelt was elected member of the Council of Ministers by the People's Chamber, in which he has been a deputy since 1950, and appointed deputy chairman of the Council of Ministers and minister for environmental protection and water management.

Water is the subject of a UN world conference which these days is meeting in Argentina. Government representatives, diplomats and experts from far more than 100 countries are represented there. In preparation for the world water conference, the GDR last fall acted as host for EUTROSYM '76, an international symposium that concerned itself with the eutrophy (concentration of nutrients) and reclamation of surface waters. Organizers of this important consultation of experts were the administrative board of the environmental program of the United Nations (UNEP) and the Institute for Water Management of the Ministry for Environmental Protection and Water Management of the GDR. The GDR regarded the execution of this symposium in Karl-Marx-Stadt as a contribution to the realization of the Final Act of Helsinki and as high recognition for our republic, which--densely populated, with a great deal of industry and very intensive agriculture--can produce many interesting experiences in water management. Thus it was a group of GDR scientists which, together with experts

of other countries, in connection with EUTROSYM '76 worked out the draft of recommendations to the UN world water conference. Problems of water management were the subject of a discussion between TRIBUENE and Dr Hans Reichelt, deputy chairman of the Council of Ministers and minister for environmental protection and water management of the GDR.

[Question] Sometimes one still meets with contemptuous phrases suggesting that water, after all, is as plentiful as sand at the sea. Mr Minister, in view of the fact that a world water conference is taking place, is this [view] not long out of date?

[Answer] Water is an indispensable and irreplaceable necessity of life, an important raw material in agriculture and industry, as well as an auxiliary production resource that safeguards and increases production in all spheres of the economy. Given the growing demand of our population for drinking water in a situation of a rising material and cultural standard of living and the increasing demand in industry and especially in agriculture, water management is growing in importance. This is urgently indicated in the decisions of the Ninth SED Party Congress.

They focus the struggle on the goal of bringing about a stable supply of drinking water for the population or water for the use of industry and agriculture. This requires the rational management of water resources with minimal social expenditures and the effective use of water management installations in all spheres of the national economy.

[Question] Would you please give us a few figures that mark off the sphere of water management?

[Answer] The employees in water management in the GDR take care of 3,890 water works; 880 purification plants; approximately 70,000 kilometers of drinking water lines; 32,000 kilometers of watercourses; 3,500 lakes and ponds; as well as 150 dams and reservoirs. These are basic assets valued at nearly 23 billion marks. To this we must add a value of nearly the same magnitude in water management installations in industry, agriculture, and other spheres of the national economy.

[Question] How great is the demand and what are the main reasons behind it?

[Answer] During the period 1971-1975, the annual demand for water increased by almost 10 percent while the water supply remained almost constant. This increase is equal to the current demand of the entire national economy for a period of 36 days. This notable increase is primarily attributable to the extensive housing construction program, the further intensification of our agriculture and the continual increase of production in all spheres of the national economy. The demand for water will increase by 1980 by an additional 17-19 percent, including an increase of 17 percent in drinking water for the population.

[Question] For the individual person, the problem for the most part begins and ends at his own water faucet. It runs--how much water does run in a day?

[Answer] While formerly approximately 25 liters were used per capita per day from the house well, the figure for old city buildings is 40-70 liters, for modernized apartments 110-125, and for newly constructed housing with all the comforts--such as bath, flush toilets, washing machine, electric water heating appliances and modern heating--up to 250 liters. During very hot days, the figure goes even up to 400 liters. A large city like Berlin requires all together--population and industry--as much water in ten days as the Mueggel Lake holds. Not to be forgotten is the fact that during this 5-year plan period 500,000 additional inhabitants must be connected to the public water supply installations, especially in rural communities.

[Question] The private household, drinking water, is only one side of the problem. Who actually consumes most of the water?

[Answer] It is industry by far. About four fifths of the total demand are used in the operations of industry. It is probably interesting to know that the production of a kilogram of artificial silk requires 900 liters of water, of a kilogram of paper even 3,000 liters. Naturally it is to be noted here that 90-95 percent of this water runs back and, after appropriate processing or cleaning, is used again. We call this the multiple use of water. Many plants make use of water in circulation. That is an essential method of rational water use.

[Question] How are these growing tasks to be solved?

[Answer] The supply of the increasing demand for water requires very high and steadily growing social expenditures. Thus in the sphere of our ministry alone the investments for water management installations during this five-year plan period are increasing to 149 percent or by 2.3 billion marks by 1975 compared with 1971. To lower social expenditures, the rational use of water, therefore, is a precept of economic reason.

In order to use water rationally and to make multiple use of it, scientific-technical measures must be carried out in all spheres of the national economy. That will enable us to lower the specific demand for water in industry by 20 percent by 1980 and thus to fulfill the goals stipulated in the directive of the Ninth SED Congress.

For us, too, the fundamental principles of socialist intensification are valid in this respect. Science and technology play the most important role here. New water-saving technologies, equipment and means of rationalization for water supply and treatment of waste water are being developed and applied. Hand in hand with this, the elaboration and application of progressive norms for the use of water per production unit create, especially for the large clients in industry, binding foundations. Frequently it is found after thorough investigations that through expedient use a greater effect can be produced with less water. For example, changes in the place of application, water

pressure, diameter of the pipe lines, temperature and other factors are decisive for economic use. All in all, the issue in industry and agriculture, in other words, is to treat the rational use of water as a task of materials economy just as in the case of other raw materials.

[Question] In this area, too, the GDR works closely with its socialist fraternal countries. Where do the centers of gravity lie here?

[Answer] The common utilization of the scientific-technical potential of the CEMA member countries is of the greatest value for all participants. Thus the agreements between the USSR and the GDR for the years 1976-1980, for example, provide for the elaboration of common projects and the development of new methods of water processing and treatment of waste water. Here we are primarily concerned with methods which give rise to the expectation of new, more rational solutions for large cities and industrial conglomeration centers. Thus we are working on problems which serve the rationalization, mechanization and automation of water management installations.

[Question] In newspaper reports there was talk about a control of processes in the middle Saale with the aid of electronic data processing, which came into being in collaboration with a Kharkov institute.

[Answer] Yes, scientists of both countries, of our Institute for Water Management, of the Water Management Board of Directors Saale/Werra and the Union Institute for Water Protection in Kharkov worked out methods of mathematical modeling of the self-purification process in rivers. On this basis it is possible to create control systems for a significantly more rational use of water and to save investments. On the basis of a division of labor, the partners solve projects for the Saale and Pleisse rivers in the GDR as well as for the Severskiy Donetsk in the USSR. The first adaptation phase was completed in 1976 and already during the first year resulted in savings running into the millions in water supply.

On the basis of this research, Soviet scientists made valuable suggestions with regard to the elaboration of a uniform water management survey net for the GDR. This makes possible the automation of the purification processes in the middle Saale [River] with the aid of such a survey net. Besides lowering the material and financial expenditures in connection with the use of water, this collaboration helped both states to lower significantly the expenditures for research and development. Especially during the 60th anniversary of the Great October, I make reference to this good collaboration with particularly great joy.

[Question] You spoke above about multiple use. How does that work?

[Answer] Although the available water supply in the course of the years remains essentially unchanged, we [manage to] cover the rising demand for water in growing measure through multiple use, especially in the industrial conglomeration areas. The operating water needed in the sphere of industry is used as follows: 70 percent for cooling, 20 percent for production, and 10 percent

for the feeding of boilers. In the Buna Plant, for example, water that has been used once for cooling purposes and in the process has become warmer is used several times over in other places. Now no additional heating with steam is necessary. A cool water circulation [system] comes into being. It is already being applied today on a wider scale as the most essential form of multiple use and makes possible the greatest savings in the expenditures for water supply, i.e., in the construction of water reservoirs--as, for example, dams--very expensive water line overpasses, pump stations, and other water management installations.

A prerequisite for multiple use is keeping the waters clean, thus the constant purification of used water, the treatment of waste water by every single user. The purification of waste water is by no means a luxury, nor an end in itself, but rather a necessary task for safeguarding the multiple use of water in the national economic reproduction process.

[Question] What is the relationship here between expenditures and gains?

[Answer] On the one hand, large investments are necessary first of all. In the case of Leuna, for example--some water there is used up to nine times--the treatment of waste water is one of the main problems. In Leuna II a central installation has been in operation since 1965. It extends over 35,000 square meters, is as large as five soccer fields and purifies more than 600 cubic meters of waste water per hour mechanically, chemically, and biologically.

On the other hand, a well-operated treatment of waste water saves us up to 75 percent on the costs that would have to be expended for the reprocessing of contaminated water in the next water-using plant. To proceed in the opposite direction would mean to produce at the expense of other plants.

The costs involved in the processing of satisfactory operating water from contaminated waters rise significantly in correlation with the degree of pollution. Thus the processing of water of quality class IV (highly polluted) requires eight times the expenditures necessary for quality class I (clean).

[Question] What role does the rational handling of water play in socialist competition?

[Answer] In all branches of industry there have been increasing efforts in recent years to use water more rationally and to improve its purification. This has shown: Where there are norms and standards, good results are being achieved. Here the work depends on exact criteria, which became the point of departure for numerous brigade obligations, innovation achievements, tasks in budget books and obligation sin competition.

[Question] At the end of February, a new directive for the economic use of water was published. Is it not aimed in precisely this direction?

[Answer] Undoubtedly. It serves the already mentioned realization of the task--set forth in the five-year-plan directive--of lowering the specific water demand of industry by 20 percent. It generalizes in an obligatory way

the manifold experiences that have been fathered in recent years. Outstanding performances in plant water management were honored each year by the award of the certificate of the Ministry for Environmental Protection and Water Management "Exemplary Plant With Regard to Water Management." Here we apply the good experiences that have been gathered in the rational utilization of energy.

[Question] So far we have looked at water from the standpoint of economic demand. But what is the situation with regard to the growing demand during weekends, for the purpose of local recreation and vacation?

[Answer] We do not underestimate it. Our socialist state expends considerable financial and material means to preserve the existing recreation areas along water and to create new ones. Moreover, all the measures that serve the purification of waters do, after all, also benefit the individual seeking recreation.

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CSO: 5000

EAST GERMANY

NEW PROCESS FOR TREATING EUTROPHIC WATER DESCRIBED

Dresden SAECHSISCHE ZEITUNG in German 11 Mar 77 Supplement p 4

[ADN Article: "Clear Outlook for Murky Water: Researchers Test New Way To Maintain Water Purity of Lakes"]

[Text] In February, an agricultural airplane of INTERFLUG sprayed billions of the finest droplets over Lake Jabel close to Mueritz in Mecklenburg. The deployment supplemented a series of highly promising experiments by basic researchers and practitioners of water management to return to this and other inland waters a not insignificant touchstone of their reactional value--the original purity.

Previously staff members of the limnology division of the academy's Central Institute for Microbiology and Experimental Therapy Jena had come up with a new insight in the course of their investigations in Stechlin Lake: The increasing development of water-cloudy organic substances in a number of inland lakes is, above all, accelerated by phosphorus. Consequently, the specialists concluded, the best way to "turn it around" and force it into normal bounds must be through the withdrawal of this mineral.

Up to now nitrogen was regarded as the primary casual factor behind harmful "algae invasions" in inland waters and stood in the center of appropriate countermeasures. Nitrogen and phosphorus, for example, are washed in as component parts of inorganic fertilizers through run-off from fields, and even in small quantities are considered to be welcome nutrients for micro-organisms in rivers and lakes. However, according to the findings of the Jena researchers, algae are not capable of development without phosphorus and thus can no longer take in nitrogen as well.

"We make use of this effect and assume that in the foreseeable future we will be able to deal more effectively than up to now with the disadvantageous 'over-nourishment' of various waters--the specialist speaks of eutrophy--" said Dr Jost Casper, director of the limnology division of the academy institution. For about a year now, the scientists have arranged for the dissemination of a special liquid at certain intervals well distributed over the area of Jabel Lake. It contains aluminum sulfate, flaking agents, and clay particles. In

the water, aluminum and phosphorus combine into a compound and sink--like a rain of flakes--to the bottom. There they form a fine layer of sediments and are prevented by the heavy clay components from forming relations anew with the "hungry" algae. Without sufficient phosphorus, however, these micro-organisms perish--the lake water becomes clearer again.

According to the judgment of experts, the new insights have consequences not only for the purification of eutrophic waters, but also for the construction method of biological purification installations in industry and agriculture. The latter would have to be laid out in such a way that they would also retain phosphorus or phosphorus compounds. Limnology or the science of inland waters is considered a part of hydrobiology. It belongs to the research disciplines that struggle for the preservation of the balance between nature and the social environment. In so doing, inter alia, scientific foundations are created which make it possible to counteract disturbances in this balance that have already happened. The work of limnologists, for example, is useful for the supply of drinking water. Limnological research tasks in the GDR are also handled by the hydrobiology section of the Technical University of Dresden.

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CSO: 5000



## YUGOSLAVIA

### CREDIBILITY CRISIS IN ZINC FACTORY'S ANTIPOLLUTION PLANS

Maribor VECER in Slovenian 28 Apr 77 p 4

[Text] Recently it has been stated at the Celje Cinkarna Zinc Factory that through the construction of a new facility for the production of sulfuric acid (165,000 tons per year) air pollution will be considerably diminished, since at the same time they will tear down the old facility (50,000-ton capacity) and will stop burning residual fuel in the boiler room. If this is so, and there is no reason for doubting the statement, we may be surprised as to why the Cinkarna was so hush hush about the fact that it was really preparing for this task and that it had concluded an agreement for the import of equipment a good year earlier.

Such an explanation could also be interpreted as though at the Cinkarna, there is not too much confidence in the citizens, since, as we have seen, the representatives of local regional communities do not exhibit confidence in the plans of Cinkarna. Of course this is not good, especially today, when the development of the self-management system demands closer cooperation and connections between organizations of associated labor and local communities.

Since clean air is one of the basic vital interests of the citizens, in Celje, citizens view their bad experiences and the extent of air and water pollution, and are particularly sensitive about these matters. Cinkarna representatives would do much better if they first had a ground level discussion with citizens in local communities about intent to construct a new facility, about its effects, and about other plans for lowering pollution, before making a final decision on investment. The fact of the citizens finding out unexpectedly that in actuality the Cinkarna had already ordered equipment and gotten the concurrence of obcina, republic, and federal organs is nearly the same as waving a red flag in front of a bull.

Representatives of Cinkarna have emphasized several times that a clean environment is also in the interest of their personnel and that they have already spent quite a lot of money for this purpose. In spite of this, it is possible to say that in the past, Cinkarna did not do enough to protect the environment and that it continues to be the largest environmental polluter in Celje. In the report for the meeting of the boards of obcina assemblies,

for example, we read that Cinkarna releases some 215 liters of waste per second into the river, and of this, 130 liters more or less are toxic suspensions. Cinkarna turns out more waste than all other factories combined; unfortunately, there are no data as to the quantity and degree of harmfulness of the material that it releases into the air.

I think that it is necessary to understand the citizens, because of their lack of confidence. Resistance will continue as long as the Cinkarna does not speak openly with the affected inhabitants, and on the other hand acquaint them with the facts of what is happening and what will be done for cleaner air and water, and when it will be done.

CSO: 2800

BRAZIL

# ECOLOGIST SEES DANGER IN NUCLEAR PLAN

Brasilia CORREIO BRAZILIENSE in Portuguese 12 Apr 77 p 5

[Text] Porto Alegre--Jose Lutzenberger, the president of the Gaucha [Rio Grande do Sul] Association for Environmental Protection (Agapon), says that the "nuclear issue, particularly in Brazil, has not been seriously regarded with respect to the dangers it represents for the population. "Until now," he says, "Brazilian ecologists have not spoken out about the perils of radioactivity, owing to their lack of familiarity with the subject. Now we are aware of the dangers, as shown by the statements of Professor Ceara Lates, of the University of Campinas."

According to the ecologist, in addition to representing serious dangers for the population owing to accidents, the installation of nuclear plants in a country could mean radioactive disaster in the event of a localized or world war. Lutzenberger stressed: "There are serious studies indicating that in the case of the Angra dos Reis plant, on the coast of Rio, any accident could mean mortal danger for the population of Rio or Sao Paulo, depending on the direction of the wind."

Last month, to illustrate these dangers, Jose Lutzenberger presented in the Legislative Assembly a study ordered by the Government of the FRG on the consequences of accidents in nuclear plants. "This study was published by the German federation of local organizations for the preservation of the environment," the ecologist said.

The study was begun in 1975; its conclusions were not published until January of this year. Meanwhile, the German Government had determined to suppress them, owing to their alarming nature, but they finally were brought to the attention of the public.

Lutzenberger stressed one of the major conclusions: "In the case of an accident in a nuclear plant located in northern Germany, depending on wind factors, concentrations of radioactive matter exceeding the dose of 600 roentgens could be carried as far as 10,000 kms."

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## BRAZIL

### CPI REPORTS POLLUTION IN BAHIA

Rio de Janeiro JORNAL DO BRASIL in Portuguese 21 Mar 77 p 12

[Text] Salvador--A report prepared by the CPI [Parliamentary Commission of Investigation] on pollution in Bahia will be brought up for debate this week in the Legislative Assembly. The report has been in the making for 2 years, and has given rise to several disagreements between Arena National Renewal Alliance and MDB [Brazilian Democratic Movement] deputies as to its conclusions.

The report states: "The state of Bahia, especially in the metropolitan area of Salvador, records cases of pollution that are already theoretically capable of causing clear and direct damage to several population centers, such as the northern coast line, the bay of Tainheiros and the area surrounding the Industrial Center of Aratu."

#### Ecological Policy

The document also emphasizes the "generalized pollution of the atmosphere, the beaches contaminated with biological agents, the streets equally contaminated by the lack of sewer lines and the presence of dwellings and activities that are prohibited near the source of water supplies."

The report also asks: "Following the example of the power of the judiciary police to stop quarrels, riots or civil disturbances, and to determine afterward who was right and who should be punished, why is it not possible for the ecological administrative police to operate in the same way to defend the productive capacity of the citizens against the threatened or flagrant damage to their health, well being and property, the instruments and products of national development?"

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## BRAZIL

### FEEMA ACTION AGAINST POLLUTION DISCUSSED

Rio de Janeiro JORNAL DO BRASIL in Portuguese 27 Mar 77 p 31

[Text] Although it has been in existence for almost 2 years, the FEEMA [a state foundation for environmental control] still does not have its System for Licensing Polluting Activities, on which all the environmental defense activity in the state will be based. Any successes to date with respect to the fight against water and air pollution, the conservation of nature and insect and rat control were initiated before FEEMA's creation.

According to Sr Haroldo Matos de Lemos, the president of the foundation, the major obstacle to more effective action, aside from the shortage of funds (this year FEEMA was allocated 0.5 percent of the state budget), is the "pressure of time." Still, this has not prevented FEEMA technicians from serving in environmental programs outside the state, through arrangements that provide additional sources of revenue.

#### Successes

Charged with harmonizing "maximum development with the minimum ecological damage," FEEMA plays an important role in the present government, which says it is concerned with "improving the quality of life of the population." Although it was authorized to function in March of 1975, it was officially established only in June, and the first funds were not transferred until the end of September of that year.

Dr Haroldo Matos said: "We actually began to operate at that time. And in this period we have developed a series of actions, among which we can cite some concrete successes: we have completed the mathematical models of the quality of the water in the Guanabara Bay and Rio Paraiba do Sul, which are now waiting for the respective reports from the WHO."

He also cited the report elaborated in the Lagoa [Lake] Rodrigo de Freitas, adding that some of its recommendations have already been adopted, such as the removal of some of the mud from the bottom of the lake and the definition of its shore line. None of these measures has managed to alleviate the problem of the periodic carnage of the fish.

"Regarding air pollution," the president continued, "perhaps the most significant success, which affects almost the entire city, is the deactivation, after this April, of more than 8,000 domestic incinerators, following a joint study by the FEEMA and Comlurb [Urban Sanitation Commission], with the support of the WHO."

"Also significant was the improvement in the quality of the air in the district of Sao Cristovao, which had the reputation of being the most polluted district in the city. Both by altering the State Gas Company's [CEG] production process (from coal to naphtha) and by installing anti-pollution equipment in the Asphalt Plant on Rua Francisco Bicalho, in May of last year."

This improvement in Sao Cristovao is reflected in foundation statistics in the annual mean index of pollution by sedimentary particles, which fell from 7 to 2.5 mgs per square cm. [sic] However, although the FEEMA provided technical assistance to the Asphalt Plant, the changes in the CEG antedated the FEEMA (they were carried out between 1969 and 1973).

The same is true of the shutting down of the incinerators. The Comlurb edict to that effect was laid down at the time of the former Institute of Sanitary Engineering (which preceded the FEEMA). The institute also initiated the studies on Guanabara Bay, Rio Paraiba do Sul and Lagoa Rodrigo de Freitas, which were later completed by the foundation.

Equipped to measure 14 parameters of atmospheric pollution (presently it measures only 8), the mobile station is still stationary. It has been in the Largo de Maracana since it began operation in February of last year. According to the FEEMA, any new equipment requires a period of calibration and adjustment, and in addition the unit has had problems with replacement parts.

As further successes during this period, the president mentioned the battle against pollution in the north of the state, through the reutilization of the "vinhoto" in the sugar plants; the work of the Micos-Leoes Biological Bank of the IBDF [Brazilian Institute of Forest Development] in the Botanical Garden; rat extermination in the Praca General Osorio and the Praca Mossa Senhora da Paz in Ipanema; and the control of rat proliferation in 127 cinemas, 14 theatres and 47 various other establishments.

#### Difficulties

"Once the criteria and the parameters for air and water quality and criteria for certain types of industry have been established, decision making is very simple. As soon as there are standards to serve as guidelines, even for the businessman himself, who frequently does not take measures because he has no idea what he is to do."

"Will this licensing, then, be so urgent for our action?" the president asked, in counterpoint to his previous statement. "If it were, perhaps it would already be in force. But through our agreements with the Association of Industrial Districts, with the State Development Bank and with the BNDE [National Economic Development Bank], we are analyzing practically all the major industries that are being established here. For the time being, our work can proceed without it.

"Our main difficulty," Haroldo Matos continued, "is the pressure of time. Our state, which takes up 0.5 percent of the area of Brazil, is the most densely populated in the country--about 240 inhabitants per square km--and is its second focus of industry. A third factor is that we have areas of unusual natural beauty here, which must be preserved."

#### Loan of Services

The present of the foundation denies that technicians who could be working inside the state are being diverted to work outside. "We only devote spare time to this type of activity. The state of Rio has priority and it is not our policy to lend our services."

But this loan of consulting services has come to provide an additional source of revenue, which the foundation very much needs. Its action plan for last year called for bringing in funds "so as to assure the sum of 8 million cruzeiros by 1 August and another 25 million cruzeiros by 10 December."

Last year, 21 percent of the foundation's budget came from its own income from the loan of such services. The estimate for this year is 23 to 25 percent. But the president explained that its services are not loaned for this reason, "because we have received great support from the state government."

This support comes to 109 million cruzeiros, the FEEMA's allocation for this year, including its own resources, which corresponds to just 0.5 percent of the state budget. Of this sum, 59 percent will be spent on personnel--the foundation has about 800 officers, 200 of whom are university level--leaving somewhat more than 64 million cruzeiros for pollution control programs.

#### Source of Income

"Pollute and pay." In Rio de Janeiro, the city that is considered Brazil's pioneer in pollution control--the former institute of Sanitary Engineering was created 25 years ago--it is common practice to pay for polluting the air and water. In 1976, the income thus generated was 1,746,330.39 cruzeiros, and in 1975 was 1,723,655.34 cruzeiros.

Although, according to the FEEMA, "the action plans must stress preventive measures, which can significantly reduce the costs of pollution," many

firms pay compensatory fines for polluting, collected quarterly, and this is why they have not yet been subjected to definite time limits for cleaning up their wastes.

Last year the FEEMA's Service for the Control of Industrial Wastes imposed fines for polluting on about 60 firms, among them the CCPE [Central Milk Producers' Cooperative, Ltd] (116,000 cruzeiros), and the Manguinhos Refinery and Prosint, firms of the same group (560,000 cruzeiros). In the same year, air pollution generated receipts amounting to 113,862 cruzeiros, with 515 fines, and in the first 2 months of 1977 there were 52 fines, totaling 9,858 cruzeiros.

But who imposes the fines? Although the police power that is indispensable to pollution control lies with the State Commission for Environmental Control (CECA), the function is actually exercised by the FEEMA itself, as its president is also the president of the CECA. Thus, by Decree-Law 134, he can levy fines as high as 14,400 cruzeiros, or single amounts less than 40 UFERJ's (Fiscal Unit of the State of Rio de Janeiro), today valued at 385,000 cruzeiros [sic]. [The figure should read "385 cruzeiros"]

The fines provided can go as high as 1000 UFERG's, or 385,000 cruzeiros, but those over 40 UFERG's [14,400 cruzeiros] require a plenary meeting of the CECA, comprising representatives of the Secretariats of State for Planning, Industry-Commerce-Tourism, Health and Agriculture, Cedae and Serla [expansions unknown], and the Special Secretariat for the Environment, the last named under the Ministry of the Interior.

#### Census

Last year the FEEMA's action plan called for the technical-economic registration of 5,000 activities in the state of Rio de Janeiro. According to the 1970 census by the IBGE [Brazilian Institute of Geography and Statistics]--the most recent figures--there are 14,097 industrial establishments. Of these, 750 would be classified as sources of air pollution and 150 as sources of water pollution.

This status report led the president of the FEEMA to declare: "It is completely unrealistic to think that the pollution problems can be solved in 1, 2 or 3 years, because the size of the investments that would be needed would also be prohibitive."



### Most Critical Areas

According to data available at the FEEMA, whose most recent statistics refer to only one type of pollutant, or particles in suspension, the atmospheric pollution in Rio de Janeiro during the last 10 years was most serious in the district of Sao Cristovao. In 1969, the most critical year, it reached an average of 378 micrograms per cubic meter.

The table below lists the annual averages for seven monitoring stations located in areas where pollution is most serious.

#### Air Pollution in the Last 10 Years -Particles in Suspension-

##### Stations

Year	Copacabana	Centro Sao	Cristo- vao	Maracana	Meier	Penha	Ilha do Governador
1967	116	89	176	104	73	50	57
1968	179	159	318	142	121	115	87
1969	156	120	378	131	138	113	82
1970	154	112	305	140	122	104	73
1971	146	134	276	143	110	138	69
1972	90	95	331	111	90	87	78
1973	140	89	266	133	102	128	87
1974	168	152	321	116	108	153	95
1975	153	115	346	151	180	149	112
1976	119	114	183	147	155	128	96

Note: the numbers refer to micrograms per cubic meter.

## Activities and Pollutants

The table below lists the various industrial activities and the type of pollution they cause. The statistics are those of the Brazilian Petroleum Institute (Air and Water Pollution Study - 1975).

Nature of Activity	Types of Pollutant
Asphalt cement	Particles - 2.5 kg per ton.
Cement	Dust - 14 kg per barrel (170 kg), wet process; 17 kg per barrel, dry process.
Glass	Particles - 0.9 kg per ton.
Metallurgy and foundry	Sulfur dioxide, dust, metallic oxides.
Reduction of aluminum	Particles - aluminum fluoride, 39 kg per ton.
Iron foundry	Particles - from 0.9 kg to 7.8 kg per ton, depending on the type of furnace.
Steel processing	Particles - from 0.045 kg to 6.8 kg per ton.
Bronze and brass foundry	Particles - from 1.35 kg to 11.85 kg per ton.
Wood and furniture	Dust, solvents, smoke.
Paper and cardboard	Hydrogen sulfides, mercaptans and particles.
Rubber	Dust, carbon and odors.
Chemicals and pharmaceutica	All forms of pollution.
Nitric acid	26 kg of nitrogenous acids (NO <sub>2</sub> ) per ton of acid.
Sulfuric acid	9 to 32 kg of sulfur dioxide and 0.14 kg to 3.40 kg of acid vapors per ton of acid (contact process).
Textiles	Particles, organic fumes, dye vapors and smoke.
Beverages	Odors and dust.
Fish processing	Odors and hydrogen sulfide, 0.005 kg, and trimethylamine, 0.15 kg, per ton of meal.

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## ENVIRONMENTAL PROTECTION MEASURES IN THE UKRAINE

Moscow LITERATURNAYA GAZETA in Russian No 12, 23 Mar 77 p 11

[Interview with B. Vol'tovskiy, chairman of the State Committee on the Protection of Nature of the Ukrainian SSR Council of Ministers: "The Quest for Feedback"]

[Text] [Question] Boris Iovlevich, I'll begin with a specific item which, I think, is of principal importance. At the Kiev Institute of Engineering Thermophysics of the Ukrainian SSR Academy of Sciences I succeeded in seeing a small electronic marvel--an automated control system for air pollution. It is surprisingly compact: the size of a small refrigerator having a number of miniaturized control and measuring stations. After a period of seconds the central station processes and recalls a mass of information on the level of pollution collected throughout the city by control and measuring stations. So, the violation is fixed. But this is not enough. For the "crime" a "punishment" should follow. Carrying out this feedback apparently has become an important task....

[Answer] That goes without saying. We have learned how to control and take things into account very well. The committee has existed 10 years and all the weak districts in the field of the protection of nature have been exposed and identified by us. Now here is what must be done (and this is a task but republic and all-union in scope) so that for every violation, I might say, is steadfastly automatically followed by a reciprocal "countervailing" measure. In the field of protection of the atmosphere feedback, of course, to a certain degree is already operating. Daily air pollution bulletins are becoming the basis for special decisions of the city executive committee right up to changing the enterprises over to different types of fuel. The automated system developed by the institute of engineering thermophysics even to a greater degree is intensifying control over the purity of the air.

[Question] But control and measuring stations report only on the extent of pollution. But who is guilty for the appearance in the atmosphere of so much, let's say, sulphurous gases or nitric oxides! Are the sources of pollution tracked down?

[Answer] This is an important question. In reality we are now taking account of the maximum permissible concentrations of harmful substances [PDK]. With the help of such a metering system we have achieved a great deal. But with a "gross" indicator we come down to equating the identity of the violator. Who did the polluting? Where is the guilty party? This is not always clear. An accounting for PDK is inadequate and the question arises about other indicators--maximum permissible discharges [PDV]. Then we can clearly keep track of the work of this or that enterprise. Today's automatic system is a necessary phase for adopting PDV. It would be worthwhile to place pickup units in a plant's smokestack. Clear feedback would arise and control over discharges would become more efficient.

The Kiev institute of engineering thermophysics is conducting work in Kemerovo where this principle is being realized. Pickup units will be installed right at the plant work site.

I began speaking with you about problems of atmospheric contamination. But we feel that all aspects of environmental protection are equally important and the principle of complexity is specified in our activities. Now not a single new building or installation can escape our committee's findings. The Central Committee of the Ukrainian Communist Party and the Ukrainian SSR Council of Ministers, in resolving the tasks on the efficient use of natural resources, the ministries and departments always ask, "And what is the opinion of the committee for the protection of nature?" And so, any project for which we must provide findings is "rolled thin" throughout the departments of our committee. It is studied by specialists from various fields. If our own efforts are not sufficient we direct the project for examination to the scientific institutes. The scientific-technical council of the committee also helps. In a word, an expanded and complex evaluation is accumulated after which the project is subjected to "bombardment" by very diverse specialists with "narrow" fields of interest.

[Question] And do many projects pass through the "crucible" of the committee?

[Answer] In 1976 6,279 projects were examined: 5,734 were approved, 302 were sent back for further processing and 243 were voted down.

[Question] It is very likely that project approval does not take place without conflicts with one ministry or another?

[Answer] That is quite true. Recently local industry in the Chernigovskaya Oblast had intentions of embarking on peat exploitation. We became interested as this would have a telling effect on the hydrometeorological regime. It turned out that peat extraction threatened to leave a region with a radius of 30 km around the exploitation point without water. We came out sharply against this and received support and the matter was dropped.

The right to ban, generally speaking, is a strong method, but it doesn't always help. When lumber organs closed down entry into the Yalta forested

mountainous preserve after some fires, this was a wise measure. But this did not solve the problem. People who are on vacation or recuperating need personal contact with nature and there cannot be any walls between them. The question is one of personal contact. There is the structure of natural parks which permits finding a happy medium, removing objections and providing an opportunity for people to take pleasure in nature and to protect it. The structure of the park is more suitable for the mountainous Crimea than for an especially forest reserve regime.

[Question] However, you were successful in imposing a ban when it was necessary to save a portion of small Ukrainian rivers from being dominated by motorboats.

[Answer] Yes, motorboats were banned on several small rivers in the Sumskaya, Poltavskaya, Khar'kovskaya, and Volynskaya oblasts, and this measure yielded good results. But, I repeat, more important by far than radical prohibitive measures is the constant daily work with people. It is important that the love for nature that has lived since childhood in a person is not forgotten when the need arises to protect it hourly in the process of his work.

Recently we heard at a committee session an account on the work in environmental protection at the Severdonetsk Industrial Association Azot. Here they have a protection of nature service. Without its signature no worker or engineer can receive a bonus. This measure compels the worker to continually follow the procedure--a real stimulant! As something builds into a habit, so man is educated.

[Question] It is probably simpler to interest an individual in the protection of nature than a whole large-scale enterprise. I was able to see the Pervomayskiy chemical plant which can be called an almost by-product free enterprise in any case close to that ideal. How were you successful in achieving this?

[Answer] From the very outset the Pervomayskiy plant was placed under rigid conditions. There was nowhere to discard by-products. Alongside is the Severskiy Donets which suffers from sewage water. Water supply is limited and is taken from artesian wells. That means that repeated use of water is necessary.

[Question] Would you call these rigid conditions normal?

[Answer] They must become the norm, but meanwhile they're only becoming the standard.

[Question] On the plant's territory in open air cages deer strut about and coolly gaze at the plant's buildings. In pools with water that has been purified swans swim and fishing takes place. And at the local restaurant in vases I saw flowers that had been grown in hothouses irrigated with plant sewage. Isn't that an impressive picture?

[Answer] Well the main thing is that man breathes easier. Production is such that there is almost complete utilization of by-products. But "almost" is a fatal word. A small portion of the waste products in the form of brine (sodium chloride) is pumped by the enterprise into the deep strata of the earth.

[Question] Is the questioning method sufficient?

[Answer] Yes, there was apprehension. Were they not reflected in underground water? But the truth is specific. In some instances the method didn't apply and in others it was good. Here the geological structure that it will allow for the pumping of brine for 20-30 years is such. And here technology is changing. Therefore it would be more correct to call the Pervomayskiy plant not an enterprise free of waste products but one without sewage.

If we speak about enterprises that require study then I'd like to name the Ordzhonikidzevkiy mining and concentration combine in the Dnepropetrovskaya Oblast which achieved excellent success in land recultivation. The combine extracts manganese ore by the open method but technology is such that land recultivation here is a usual industrial process. This is not a luxury that is strived for but which might be neglected but is exactly a necessary link. Expenses for land recultivation are included in the cost of the ore. After the ore has been extracted, the open pit mine is filled in with the upper portion covered with chernozem which was at one time hauled in. On areas where formerly there were deep open mines wheat is formed and gardens bloom. An entire industrial cycle is carried out, a complete circuit, a logical circle which we painfully seek all the time.

[Question] Yes, the number of enterprises capable of mutual cooperation with nature is on the rise. But there is an area in man's daily life which as yet has been curbed only slightly. I have in mind the automobile.

[Answer] City automobile traffic is intensifying. At the same time our engineering on the problem is increasing. The Ukraine has never had in this field as many experiments and design proposals as now. The Dnepropetrovsk Chemical and Engineering Institute imeni Dzerzhinskiy proposes an internal combustion engine based on ammonia-alcohol mixtures where the exhaust fumes will be free of harmful substances. The Voroshilovgrad Machine Building Institute is working on the creation of a low toxicity engine. The Khar'kov Institute of Machine Building Problems of the Ukrainian SSR Academy of Sciences created hydrogen fuel which when combusted leaves no harmful by-products. Such fuel does not require major engine changes, and if this fuel is used mixed with gasoline then the motor requires no change. This last compromise variation is also quite promising because the engine's efficiency increases while the toxicity of exhaust fumes decreases 10-15 times and the octane simultaneously increases and removes lead additives from the gasoline.

[Question] Now more and more we hear the term "hydrogen civilization," which is a civilization that will be based on ecologically "pure" hydrogen energetics.

[Answer] The outlook here is massive and as an actual realization of great expectations there are already two vehicles running about the streets of Khar'kov: the Zhiguli, running on a mixture of gasoline and hydrogen fuel and the Moskvich, operating, if overstated, on... pure water.

[Question] Your committee and its oblast inspections, first and foremost, practice the function of control. But control is also done by the hydrometeorological service, by the water, air, fish inspectorates, etc. Isn't this a duplication of effort?

[Answer] On occasion this happens and the structure of the natural protection organs still requires improvement. But there is a sharp difference between our control and that of departments. Water inspection, for example, is controlled by its own ministry.

[Question] Does that mean that the department controls itself?

[Answer] Yes. That's also the situation at several other departments. The Ministry of Agriculture uses toxic chemicals and carries out control over them. Apparently, there are therefore frequent instances of a simplified approach to the application of poisons and fields are treated with pesticides where other solutions are possible. In particular, there is the use of biological methods to combat pests. Don't you recall the damage caused by the Colorado beetle to potato crops? Much toxic material is needed to deal with these beetles. Cannot other means be found to combat it? There is an excellent hunting area near Kiev called Dymerskoye. Pheasants are bred there and distributed to the oblasts. They tried to place pheasants in potato fields and the beetle was gone. That is an excellent means providing a double effect: the trouble was eliminated and as a plus they had their own source of meat.

[Question] We have spoken with you on various forms of managing nature. You mentioned natural parks as a means for solving the conflicts between man and nature. Conflict stirs life. You have to work with conflict otherwise things turn out poorly. National and natural parks are developing all too slowly in the country. How can we deal with this matter in the republic?

[Answer] Now two projects have been developed for natural parks in the Ukraine: the Carpathian and the Shatsk. But in all, as we decided at a collegium of the committee, the republic should have 10. Ahead lies much work and the needs are for some kind of organizational measures, because the problems lack a master.

What is apparently needed is some kind of specialized administration that might work on this problem in earnest.

[Question] But isn't your committee doing this?

[Answer] Perhaps, but meanwhile there is little power. The work volume is immense. We have to study and evaluate the ecological condition of various

regions in the republic, analyze plans, resolve conflicts, issue our information-systematic bulletin RODNAYA PRIRODA, manage the national universities and "houses of nature" in various cities and collaborate with the scientific institutes. Should we take on an additional load? It's possible. But to do so we need reinforcement.

We are now 10 years old. The committee was founded 25 March 1967. And the state effort in the protection of nature in the Ukraine is already 50 years old. We take account from June 1926 when there was the decision of the Ukrainian Central Executive Committee on assisting in the matter of protection of nature to the commissariat of education. Don't you think it's time for maturity. But maturity not only sums up and considers achievements, but it even permits for clearly looking at the many problems that are still not solved.

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## WATER CONSERVATION MEASURES IN BAKU

Baku VYSHKA in Russian 9 Apr 77 p 3

[Article by M. Babayev, chief of the Baku Water Pipeline Administration: "If We Do It Economically: A Three Month Struggle for the Efficient Use of Water"]

[Text] In recent years thanks to the active help of the Central Committee of the Azerbaydzhan Communist Party and the republic's Council of Ministers much work has been done in the field of supplying water to the republic's capital. The Kura water supply line and the supply line of recycled water from the Dzheyran-Batanskoye reservoir have been constructed and put into operation. As a result average daily per capita water consumption is up 1.3 times. This has allowed for the entire housing fund of the local soviets to be equipped with a centralized water conduit.

However the problems of conserving drinking and recycled water continue to be of primary importance. After all, with every passing year more and more new housing units and industrial enterprises are activated. The city of Baku requires water in ever increasing amounts. Therefore rational consumption is under the constant control of both specialists and society. And so, the Baku People's Control Committee recently conducted a citywide examination of consumption of drinking and recycled water. A number of facts emerged about the non-economic regard for using drinking and recycled water at industrial enterprises, and at organizations and institutions. In this way savings were realized for about five million cubic meters of water.

The result was not bad. Additionally it must be noted that we still have far from exhausted our reserves for conserving water. In great numbers water is consumed by the city's industry beyond the established limits. One of the basic reasons for this is the all too slow introduction of circulating water supply systems.

An analysis made by the Institute of Water Problems of the republic's Ministry of Land Reclamation and Water Management [Minvodkhoz] indicated that the introduction of a circulating water supply system allows for savings of some 10,000 cubic meters of water daily.

A major transfer of water above the established limit has been tolerated by the Novobakinskiy Petroleum Refinery [NBNZ] imeni Vladimir Il'ich, the petroleum refineries imeni 22nd CPSU Congress and imeni Karayev, the Baku tire plant, the production association imeni N. Narimanov, the railroad car repair plant imeni Oktyabr'skaya Revolyutsiya, the shipyard imeni Zakfederatsiya, the Khyrdalanskiy brewery and others. In all 98 enterprises due to overuse paid an increased tariff of 792,000 rubles.

It must be noted that not all executive committees [ispolkom] of the rayon councils of workers' deputies as well as municipal services administrations, administrations for housing, tree planting, trade, and the administration for motor vehicle servicing took the necessary measures to carry out the decision of the Baku city ispolkom "On the Condition and Measures to Improve the Water Supply System to the Populace and the Industrial Enterprises of the City of Baku."

And so, by this decision it was proposed that the city's trade administration cease using drinking water for cooling compressors of refrigeration devices in food stores. But now in just the Nasiminskiy, Oktyabr'skiy and Imeni 26 Bakinskikh Komissarov regions of the city more than 50 water cooled compressors are operating. This means that about 3,000 cubic meters of drinking water are daily discarded into the sewage system.

The main Azerbaydzhan energy organization Azglavenergo, and several ministries and departments are not guaranteeing fulfillment of measures to use softened sea water instead of fresh at power plants and enterprises, and as a result are tolerating a major overexpenditure of fresh recycled water.

The losses of drinking water in the housing sector are so great that they reflect extremely negatively on the city's water balance. Based on available data, in a number of microrayons due to great leakage, mainly through flush tanks, the per capita consumption of water exceeds the standard by 1.5-2 times. This is because from the time the apartment houses on large housing tracts go into operation more than 60 percent of the sanitary technical equipment has been disabled and requires urgent repair.

A selective check of eight apartment houses in the 2nd, 3rd, 5th, 7th and 8th microrayons showed that 38 apartments were completely without flush tanks. Here the water falls indirectly with the aid of hoses. This sharply decreases pressure in the system and the inhabitants of the upper floors lose the opportunity to obtain water.

Meanwhile the housing operations and housing municipal services offices do not exercise the necessary control over the internal water supply system and the sanitary and technical equipment. They do not take practical measures to decrease unproductive losses of drinking water.

And the commercial organizations, in particular the Azerbaydzhan Specialized Organization for Trade in Household Goods [Azerbkhoztorg], are completely un-

satisfactory in satisfying public demands for technical equipment and spare parts. People are unable to purchase valves, faucets, gaskets, washers, siphons, pipes, fittings, governors, rubber valves and float devices and many others.

Domestic services might make their contribution in resolving this problem having organized workshops to repair sanitary and technical fittings from public orders.

Becoming more acute is the problem of washing individual automobiles. A decree of the Baku city council ispolkom proposed that the rayon ispolkoms and the State Automobile Inspectorate [GAI] adopt measures to prohibit washing of automobiles in courtyards and on the city's streets. Great amounts of drinking water are now consumed for this purpose. But the administration for automotive servicing has still not organized motor vehicle wash points using circulating water supply systems.

Great tasks stand before the Baku water pipeline administration's water wells in Baku and on the Apsheron Peninsula. By means of water from them it is possible to maximally provide water for tree planting and allow for ceasing use of drinking water for this purpose and significantly lower the expenditure of recycled Dzheyran-Batanskoye water. Besides this, construction of a pumping station for recycled water from water pipeline systems is nearing completion. When it becomes operational there will be the possibility of providing watering to the planted trees and shrubs on the Akhmedlinskoye plateau and to the villages of Razin and Serebrovskiy.

In the summer, in view of the great consumption of drinking water and the decreased pressure in the system there is a significant deterioration in the water supplied to the upper stories of apartment houses. Now a mainline water conduit is under construction. It will allow for the elimination of dozens of local booster pumps, will increase the pressure in the system and to a great degree will improve water supply.

Estimates show that the amount of water now supplied to the populace under conditions where present inadequacies are eliminated in the activation of sanitary and technical matters of apartment houses, where circulating water supply systems are adopted by the enterprises, and where water is used economically and efficiently allows for a major improvement in supplying water to the people of the city. This is a matter that concerns all of us.

This is why beginning 1 April a three month effort has been declared for the economic consumption of water. In this measure those on the people's control committee and the general public have taken upon themselves control over this important area of the municipal economy. They will do everything to make use of the great reserves on hand.

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## USING SECONDARY RESOURCES

Moscow EKONOMICHESKAYA GAZETA in Russian No 14, Apr 77 p 19

[Article by S. Dudenkov, doctor of technical sciences and A. Setskiy and V. Krotkova, engineers: "Secondary Resources--Extensive Recycling"]

[Text] In a report to the 25th CPSU Congress, general secretary of the CC CPSU, Comrade L. I. Brezhnev, elucidating on economic and social tasks requiring solution in the 10th Five-Year Plan, stated: "...it is necessary to achieve more efficient utilization of resources, including that obtained by the decrease in the physical capacity of production and by the adoption of cheaper and effective materials, as well as by economic expenditure of them."

In resolving this task a major role belongs to involving refuse, secondary and by-products in economic circulation. The work on use of secondary resources in our country is headed by the USSR State Committee for Material and Technical Supply [Gossnab] and branch ministries and departments.

In this important matter concrete success has been achieved. However, up to now many contemporary methods to eliminate and reprocess by-products are imperfect and lead to irretrievable losses of millions of tons of valuable materials.

Presently a new trend has been building in the development of industrial production, the basic purpose being the complex use of raw materials, the utilization of industrial and domestic waste products, the regeneration of all or almost all mineral resources which might be repeatedly used in production.

### The Effect--Economic and Ecological

The manufacture of products from secondary raw materials allows for a decrease in capital outlay, current expenses, for a significant lowering in the use of water and electricity, and for reducing the volume of extraction and consumption of primary raw materials, etc.

And so, for example, in the production of aluminum from secondary raw material capital investments have been reduced by 40 percent, and electricity by 25

times in comparison with production of aluminum from natural raw materials. The utilization of waste paper provides for savings in the production of one ton of paper and cardboard boxes of 4.5 cubic meters of lumber, up to 200 cubic meters of water and for a two times reduction in electricity. Recasting one ton of scrap metal requires significantly less energy and lowers the volume of recycled water and primary raw material needed.

However, the economic expediency of using by-products in industry cannot be the only criterion for evaluation. Today even more important is the significance attached to environmental protection whose preservation is the duty of everyone.

Practice shows that production based on secondary raw materials is coupled with a decreased influence on the environment than equivalent production based on primary materials. Therefore, in recasting one ton of scrap metal there is an 86 percent decrease in atmospheric pollution, a 76 percent decrease in water pollution and a 97 percent decrease in the volume of waste products.

This is why in our country the problems of environmental protection, conservation of primary raw material resources and the use of secondary resources are being looked at as a unified problem and the utilization of by-products as a large national economic task.

Our country has established and constantly improves legislation on the protection of nature. However, in the field of utilization of secondary resources there are no legislative acts as no unified center exists to coordinate or regulate their use in the national economy.

#### All By-Products--in the Cause

Our country in recent years has carried out a number of important measures aimed at improving the collection and use of secondary resources in the national economy. For example, in 1976 every third ton of steel, every fourth ton of paper and cardboard, every fifth ton of non-ferrous metal was derived from by-products and every fifth ton of sulphuric acid from exhaust gases.

In the Ninth Five-Year Plan the use of secondary raw materials provided the opportunity to save 36 million cubic meters of commercial timber, about two million tons of cotton, wool and other fibrous materials, 643,000 tons of soda ash, more than 600,000 tons of synthetic rubber and to output various products valued at 4.66 billion rubles. In just the last year of the Ninth Five-Year Plan 44 million tons of ferrous metal scraps were gathered and reprocessed.

Unfortunately, despite the work done, the level of use of secondary material resources is still inadequate. Annually the national economy forms million of tons of scrap metal and ferrous metal waste products, lumber waste products, tens and hundreds of tons of incidental and secondary by-products from the chemical, petrochemical and light industries and at enterprises of other branches. These are far from completely utilized resulting in branch losses of billions of rubles.

As an example the country's coal concentrating mills and mines annually unload in dumping grounds 170 million tons of waste products from the coal concentration process. Tens of millions of rubles are annually spent on this storage while their use in the production of building materials amounts to less than one percent.

The problem of domestic by-products is of special importance. According to data of the USSR Central Statistical Administration [TsSU] for only 1975 they comprised about 25 million tons and for burial required the use of 16,000 hectares of mainly fertile land. Forecasts indicate that by 1980 they will amount to almost 40 million tons a year.

Today domestic waste contains up to 80 percent of valuable components suitable for recycling. Domestic waste is a valuable raw material from which protein containing feed for cattle can be derived and compost for fertilizer made. From domestic waste it is possible to extract practically all metal, up to 50 percent of textiles, waste paper, polymers and glass. However, up to now in a number of cities of our country rubbish burning rather than rubbish recycling plants are being built.

Also insufficient is the level of procurement of secondary raw materials. And so, in 1976 of the possible resources available for collection procurement for secondary textile materials was 54 percent, waste paper 68 percent, broken glass 63 percent, etc. At the same time the volume of procurement of secondary raw materials last year exceeded the existing capacity for its use in industry. As a result purchasing organizations had to repress the collection of waste paper.

What must be done to improve the use of secondary raw materials in the national economy? To accomplish this a complex of organizational, physical-technical and social tasks have to be solved.

The cumulative flow of letters on questions of secondary raw materials received by the USSR Gosstnab and its organs as well as at magazine and newspaper editorial offices attests to the growing concern of the Soviet people for a thrifty, economic regard for assets and natural resources and for environmental protection.

Despite the diverse approach to solving problems in the procurement of secondary raw materials the tenor of all letters reviewed indisputably was one--the need to improve in every way possible the procurement of secondary raw materials, to conduct a search for new forms for enlisting the population in the resolution of this important question, and to develop efficient methods to agitate for mass work among the populace.

Simultaneously, based on modern housing planning and construction, the principle of destroying secondary materials has been established. Not a single plan provides places for their preservation--not in an apartment, nor at the entrance nor at the sanitation site.

In the mirorayans being projected plans call for all domestic services except for reception points for recyclable materials, despite the fact that they are included in the construction norms and rules of the USSR State Committee for Construction Affairs [Gosstroy].

In Leningrad and in a number of other cities very good results are being obtained at the reception point stores for collecting secondary raw materials from the people in exchange for goods in high demand. However, despite the corresponding governmental decree on this question, in a majority of cities the local power organs are not allocating to secondary raw material procurement organizations either the corresponding premises or goods.

#### Ways To Solve the Problem

USSR Gossnab outlined a series of measures which allow for a significant improvement in the use of secondary resources. By 1980 capacities will be created to output cardboard from waste paper, non-fabric linen for various purposes from secondary textile materials, and capacities to recycle secondary polymer materials outputting from them tubing, packaging and other articles.

In all in the 10th Five-Year Plan the use of secondary raw materials will allow for manufacturing goods with production and technical purpose and for popular consumption valued at 6.5 billion rubles.

But even while achieving this, it would seem that good results from the use of available secondary raw materials will be far from complete.

The problem of the efficient use of the raw material base and the utilization of waste products of production and consumption is a complicated task having national economic significance. And its successful resolution might be realized only on the foundation of a complex industrial development plan with the participation of all branches of the national economy.

It seems expedient to introduce a special section to the national economic plan which outlines the volumes of procurement and recycling of secondary resources; the output of products from by-products and incidental products or their percentage content in manufactured items; the volumes of secondary material resources given to other enterprises or departments for goods production output; the assignment to the ministries and departments for manufacture of equipment, operation lines, and mechanized means for the collection, processing and recycling of secondary resources.

These, as well as a number of other points introduced in the state plan, will permit for significantly increasing collection and for complete and the most effective reprocessing of procured secondary resources.

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## EXPOSITION ON ENVIRONMENTAL PROTECTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 14, Apr 77 p 19

[Article by Ye. Shumakova: "A University of Knowledge About Nature"]

[Text] "The exhibits and stands at the protection of nature pavilion are filled with interesting and informative materials and equipped with visual aids and descriptive scale models and systems. After a total of some two hours acquaintance with them one feels as if he has taken a university course on the subjects of environmental protection and the efficient use of natural resources."

Such is the content of notes of many of the responses in a book concerning the protection of nature pavilion at the Exhibition of Achievements of the National Economy of the USSR [VDNKh].

Specially designed stands in the pavilion's halls provide a visual display of what is being outlined to be done and that which has already been achieved in resolving environmental protection problems. In our country greater expansion of land resources is being realized. In just the Ninth Five-Year Plan 9 million hectares of land was irrigated and drained.

The information and the protection and use of water resources is interesting. For example, every one of our country's inhabitants annually uses an average of 1,100 cubic meters of water. The national economic annual consumption amounts to 316 cubic kilometers. Fresh water supplies are not limitless. With the aim of economic use of water resources at industrial enterprises there has been wide introduction of sewage water purification as well as circulating water supply systems. In just the last five-year plan more than 5,500 large-scale purification complexes were built. Here in the halls of the pavilion there are systems and scale models of industrial enterprises on display which have achieved the best results in purifying sewage water.

The attention of the specialists is drawn to the model and systems of sewage treatment plants of the Pervomayskiy chemical plants (Ukraine). The water is cleaned and used repeatedly, and from the by-products formed after sewage



purification the plant obtains additional commercial products--nitrogen fertilizer, protein-vitamin concentrate and others. The annual economic effect from introducing sewageless technology amounts to 4.5 million rubles a year.

At the exhibit devoted to gas purification methods and dust trapping we also see a purposeful system of measures. Owing to putting this system in practice, in just the past year our country has realized about 160 million tons of harmful discards being trapped from exhaust fumes.

A number of exhibits is devoted to the conservation and efficient use of the plant and animal world. Specialists might acquaint themselves with the work practices of the finest natural preserves, specialized preserves, botanical gardens, and zoos concerned with the complex study and conservation of plant and animal life. Noteworthy is the fact that our country has approved the "USSR Red Book" which enumerates rare plants and animals and species threatened with extinction that are strictly protected.

"Our thematic exhibits change every two or three months," Galina Vasil'yevna Yepikhina, manager of the pavilion section on the protection of nature, tells us. "This year exhibits will be designed under the titles 'The Efficient Use and Protection of Water Resources of the Azov, Black and Baltic Sea Basins,' 'Improving the Protection of Landscapes ' and others which, doubtlessly will be of interest to visitors. Taking place in getting them ready were many ministries and departments. Over the course of every year we conduct conferences, meetings and 10-day seminars and carry out other measures."

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DUTCH PLEASED WITH RESULTS OF MAR DEL PLATA CONFERENCE

Rotterdam NRC HANDELSBLAD in Dutch 7 Apr 77 p 5

[Article by W.H. Weenink]

[Text] Confrontations between the poor and the rich do not dominate all international conferences between the developing and the industrial nations. The recently ended World Water Conference of the United Nations, according to the Dutch delegation, was carried out in harmony, without significant confrontations and without being blocked by political questions of procedure. And the Dutch delegation reports that the representatives of all of the participating nations are satisfied with the results.

This atmosphere of peace and rest is indubitably to be attributed to the fact that more than half of the delegates were technicians. There was no difference of opinion among them about the gravity of the water problem; the discussions remained "substantive" (as one member of the Dutch delegation observed), and the politicians present were so cognizant of the expertise that they were quite put off from demanding binding rules of play.

The Mar del Plata Plan of Action (named after the Argentine seaside resort where the water conference was held) was also cast in a very unconfining form. It contains only recommendations for national, regional, and international measures for the best possible utilization of the scarce useful water of the world. No country is bound to hold itself to them.

Despite the reported accord, some of the African countries were said to have left Argentina with a feeling of resentment. The new fund for the financing of water projects in the Third World that they proposed encountered massive resistance from the rich countries as well as from most of the countries of Asia, Latin America, and the Arab world. These countries saw no advantage in a new financial institution. It was resolved to ask UN Secretary General Kurt Waldheim to commission a study concerning the feasibility of making more money available for water projects. This was to be brought up at a subsequent meeting of the UN General Assembly.

The Dutch delegation's return trip must have been taken in high spirits.

According to Chief Delegate Vigeveno, 90 percent of the Dutch wishes are reflected in the final resolution. He included among these the Dutch attempts to regulate water supply at the community level, to involve as large a part of the population as possible in this, to place water supply ahead of agriculture (irrigation, drainage), to underscore the rôle of woman in water supply, and to call attention to the effect of good water on public health.

Among the 10 percent of the Dutch plans which could not be realized at Mar del Plata was the desire to awaken more interest in the Dutch-financed WHO International Reference Centre for Community Water Supply (IRC) at Leidschendam. This is an organization which the World Health Organization and the Dutch government founded jointly in 1968 in order to improve the water supply, specifically in the developing nations. The IRC functions as the focus of a network of four regional centers and a number of national institutions. An attempt by the Dutch delegation to get the IRC mentioned in a resolution dealing with activities following the World Water Conference failed, however.

Even though according to the Dutch delegation political questions stayed in the background, they were not without significance. Indeed, the resolution introduced by African and Asian countries dealing with water policies in occupied areas led to the only vote of the conference. (All other resolutions were passed "by consensus.") The resolution condemned the policies and activities of "colonizing and/or dominating powers" ... "specifically in Palestine, Zimbabwe [Rhodesia -- translator], Namibia, and Azania (South Africa--editors)." In the plenary session, 52 delegations voted for, 17 against (among whom were the Netherlands and most of the Common Market countries), and 22 abstained. The number of African countries which abstained from voting by being absent was striking.

Also of interest from a political angle was a resolution dealing with the Panama Canal. In this resolution the conference expressed its desire that the negotiations between Panama and the United States culminate as speedily as possible "in a just and equitable solution which will allow Panama to exercise its sovereign rights in full over that portion of its territory known as the Canal Zone." The reaction of the American delegation, which did not demand a vote, was seen as a change of course.

The conference held protracted discussions of a proposal by Bangladesh that called for a code of conduct to be established for countries sharing a river with one another. Bangladesh was certainly thinking of her conflict with India over the water of the Ganges. After extensive discussion, which took up 11 days, the conference resolved to agree on the recommendation that countries that have not yet reached accord on shared water sources "shall exchange relevant information on which future utilization of these sources can be based in order to counteract damage." The Dutch delegation was able to concur in this weakened resolution. Although the Netherlands must deal with enormous problems resulting from shared rivers and is an advocate of international regulation, the Bangladesh recommendations at Mar del Plata went into too much detail, since each river basin exhibits its own peculiar problems.

## NETHERLANDS

### CONTAMINATED SEA WATER THREATENS SEALS' SURVIVAL

Rotterdam NRC HANDELSBLAD in Dutch 23 Apr 77 p 10

[Article by F.G. de Ruiter]

[Text] [Arnhem, 22 April. -- Early next month the Verein tot Behoud van de Waddenzee (Association for the Preservation of the Wadden) will again remind the public of the shocking decline in the number of seals in the Dutch portion of the Wadden. This action is more or less a follow-up to a recent meeting of biologists from several Western European countries. The conference, which was held in the Rijksinstituut voor Natuurbeheer (National Institute for the Conservation of Nature; RIN) at Arnhem, concluded with a resolution which talked of alarming symptoms of poisoning in the North Sea and the Baltic. Along 20 to 30 percent of the coastline the water is so contaminated that in the long run all life in the sea is threatened.

What took place at Arnhem was a periodic meeting of the International Seal Study Group, under the direction of Dr J.L. van Haaften, head of the Department of Wild Biology of the RIN. The species of mammals dealt with here is one of his specialties, but he gets more sorrow than joy from it. Last year the number of seals in the northern Netherlands dropped again, to the low figure of 375 according to a count made in September. If the decline continues, the animal will soon have disappeared from our waters.

There was a time when seals numbered many hundreds in the area of the Wadden and the Zeeland current. In the southern Netherlands the seal can hardly be found today because of the works on the deltas. Last year only 12 were sighted on the sandbanks outside the dams.

#### Bounty System

The highest figure known for the area of the Wadden is 2,700. This is an estimate for the prewar years, when the government was still issuing a bounty for each dead seal. This measure was introduced to protect the herring fisheries. Not only did the seal compete with the fishermen, but it also damaged the nets.

After the war the bounty system disappeared, and in 1954 the seal was accorded some protection in the hunting act. The animal could be hunted only under special permission from the authorities. Since the hunters were primarily after the young -- and particularly its bright pelt -- the count quickly decreased until in 1959 there were only 900 left. That was the stimulus to start a study that was assigned to the then ITBON, one of the precursors of the RIN. Three years later the seal was completely protected.

That had desirable results. The population increased by degrees until in 1968 almost 1,500 were counted. Still, that was the highest postwar year, for since then there has been another rapid decrease in the count. Each year there have been fewer than the year before, and last year there were fewer than four hundred. The search for the cause of this rapid decrease is directly primarily towards reproduction (propagation) and mortality (death rate). As concerns the latter, the researchers are slowly becoming convinced that chemical pollution plays a large part, not to say a dominant one. Through its prey animals, primarily butt and shrimp, the seal, which is at the end of the food chain, ingests an increasing amount of chlorinated hydrocarbons and heavy metals (mercury). The residues build up in the liver, brain, and fat deposits until a fatal dose is reached.

A large part of the poison comes from the Rhein. Contaminated Rhein water flows northward along the northern Dutch coast and enters the Dutch part of the Wadden between Den Helder and Texel. That should explain why the number of seals is declining more rapidly in the Dutch of the Wadden than it is, e.g., in Schleswig-Holstein.

Different causes of death are found in young seals. Some starve when they lose their mothers, others drown in nets or are shot. Often parasitic infections are found, which usually occur when the animal can offer little or no resistance for extraneous reasons. Disturbance in its territory, whether from tourism, drilling, or military maneuvers, is also very bad for the seal.

#### Propagation

Side by side with that, there are stagnations in propagation. Dr Van Haaften attributes them primarily to ingestion of the chemical PCB (polychlorobiphenyl). Studies in Sweden have shown that deviations in the fertile female under the influence of this poison can cause an animal to be unable to give birth to any more young. In the Gulf of Bothnia, where the PCB content is the highest, only 27 percent of the female seals now bear young, as compared to an earlier percentage of 80 to 90 percent.

This chemical also permeates the Dutch portion of the Wadden, and here, too, fertility has fallen off sharply. The causal connection seems evident. Aside from that, no deviation in the fertile female has yet been demonstrated in the Netherlands, but that could not be done for lack of research material.

It may be said in conclusion that the seal population is not only visibly decreasing but also quite aged. On the one hand there is a decrease in the birthrate and on the other there is a high infant mortality.

#### Germany

Until a few years ago this was almost solely a Dutch problem. Most of the Wadden is German territory, but that country did not begin to concern itself with the seal until 1970. Since that time the animal has been protected in Lower Saxony. Four years later Schleswig-Holstein followed, but only with great hesitation, because the population there has not decreased.

In the two participating countries only sick or wounded animals may be shot, and they must be turned in to a government institution. In Denmark seal hunting is still permitted. Of course, the hunting season has been shortened and reservations have been established where hunting is not permitted. Dr Van Haaften expects that in not too long a time there will be general protection in Denmark as well.

In the meantime, biologists from the Netherlands, Germany, and Denmark have formed an international seal study group, which has been expanded to admit a few Swedes and Englishmen. They are ringing the alarm in Arnhem with their resolution, which is being brought to the attention of the various governments. "You still hear people proclaiming that the difficulties are purely local," Dr Van Haaften says, "but nothing could be further from the truth. The contamination already affects 20 to 30 percent of the European coastline. You cannot call that a local problem any more."

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#### Biologists With Transmitters Search for the Seals' Winter Range

Seals like to stay where sandbanks are dry at low tide. They need them to rest and to give birth to their young and suckle them (normally one per season). The Wadden is thus an excellent "biotope" for the seal, especially in view of the abundance of food in the form of flatfish and shrimp.

As soon as their prey move to deeper waters in the fall, the seal follows, but just where he spends the winter is not known. Dr J.L. Van Haaften of the RIN in Arnhem speaks of a "missing link" here in biological knowledge.

But he hopes to fill in the gap. The plan is to catch a fullgrown, healthy seal this fall and fit him with a transmitter that will emit signals as soon as the animal comes up for air. The signals will be received on a boat that follows the seal. It is hoped in this way to find out how far the seal migrates from the coast.

Dr Van Haaften says, "If we want to explain the rapid decline in the numbers of seals, we must also find out where the animal spends the other half of the year."

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SWEDEN

## ENVIRONMENTAL LEGISLATION REDUCES MINING OPERATIONS

Stockholm DAGENS NYHETER in Swedish 15 Apr 77 p 36

[Article by Bo Engzell: "Environmental Struggle Against Mining Worries Shrinking Professional Group"]

[Text] Grangesberg, Thursday--Between 1,000 and at most 2,000 mining jobs will be eliminated in Sweden in the next few years, says the chairman of the Swedish Mineworkers Union John Naslund in Grangesberg to the DAGENS NYHETER. But after that it could get worse, if for environmental reasons new mining of ore in southern Sweden and the southern mountains will not be permitted. If excessively large areas are exempted from ore mining, it will mean that the Swedish mining industry will soon be gone, Naslund believes. Because the ore will soon run out in many of the Swedish mines.

The Swedish mineworkers union now has 11,000 members.

"But now the reductions begin this year," says John Naslund.

Announcements of reductions and decisions to close down are many. LKAB [Luossavaara-Kiirunavaara Corp.] will perhaps reduce the labor force by 700-800 people, the Adak mine in Vasterbotten is closed for lack of ore, in central Sweden large cuts are expected at Grangesberg, potential or already determined shutdowns for example at Stallberg, Stripa, Haksberg and Blotberget, while Idkerberget has already been closed and Stollberg's mining operations are threatened by the fact that the supply of ore is running out.

### Crisis

There is justifiably talk about a crisis in the steel industry and in the iron mines intimately connected with that industry.

"But it is far from all of the Swedish mines which have problems selling ore," John Naslund says. For the sulphide ore mines the situation is improving. This concerns the mining of for example copper, zinc and lead. The unrest in the copper province of Katanga in Africa could also force a further increase in the copper prices. About 3,000 of the 11,000 Swedish mineworkers work in sulphide ore mines.

"Paradoxically, there is a need for employment of mineworkers in some of these mines, for example Ammeberg in southernmost Bergslagen. But it is difficult to get mineworkers who have put down roots in one place to move. They often prefer to stay and look for other jobs. Factors such as working environment and working conditions have become increasingly important to many, when the wage differences are not so large, in Naslund's opinion.

#### Wage Proportion Unchanged

The union leader at Gruv believes in an increasing restructuring of the Swedish mine industry from iron ore to the more profitable sulphide ore. The mines in central Sweden can no longer export iron ore. Competition from countries in which the ore is easily retrieved by strip mining is too great. John Naslund does not believe that the higher level of wages in Sweden is of great importance.

"The wage proportion per mined ton of iron ore in Sweden on the whole has remained practically unchanged for a few years and furthermore constitutes such a small part of the total that it does not matter, while on the other hand it is the other costs which have skyrocketed, such as expensive machinery, increased freight costs and more expensive power," he says.

But in order to be able to carry out a restructuring to sulphide ore it is necessary both to intensify the search for ore deposits and not to reject mines, John Naslund emphasizes. The future of the mining industry in Sweden is dim for many reasons other than the economy. Central Sweden is most strongly affected. Uranium mining at Ranstad would provide 800 new jobs, and there is also uranium in other places. We do not know if it will be possible in the future to have a Swedish mining industry with the many restrictions some people want to impose for environmental reasons.

#### No Panic

The attrition within the Swedish mineworkers' union will to some extent be "natural." The lowered retirement age will contribute to the reduction of the union.

But John Naslund also wants to warn Stora Kopparberg, Grangesberg and LKAB not to reduce drastically the labor forces in the mines in a panic. The economy can change rapidly again and the need for mineworkers can increase quickly. Then you do not get any if too many have been laid off. In the past it has been difficult to recruit new people for mineworking and it will thus be even more difficult in the future. No one joins an industry that seems too uncertain.

The mineworkers' union also wants to nationalize the mines in order, among other things, to get better coordination of the need for ore. A single owner of the mines would solve many problems, is the opinion.

"There are many major questions about the Swedish mining industry which we will discuss at a congress to be organized in August in Stockholm," John Naslund says.



SWEDEN

# NEW METHOD PURIFIES AIR BY USING ELECTRICALLY CHARGED FOG

Stockholm DAGENS NYHETER in Swedish 15 Apr 77 p 37

[Article: "Silicosis-Dangerous Air Washed With Fog"]

[Text] A new method of removing dust from the air is being developed at the Stockholm Institute of Technology. By using electrically charged water fogs, the dust particles are caught and can be precipitated. Successful attempts have been made to purify air of fine quartz dust which poses a great risk of silicosis. If successful, the method can become a good and inexpensive alternative to electrofilters for smoke gases.

The STU [expansion unknown] has granted funds for continued research. A developed experimental facility will now be built, the magazine NY TEKNIK reports in its most recent issue.

In crushing rock, for example, the finest dust particles are electrically charged. In quartz dust most of the particles below the magnitude of four thousandths of a millimeter have a negative charge. Since they thus have the same charge they repel one another and can stay suspended in the air for a long time in comparison with larger particles which sink down.

Quartz particles smaller than four thousandths of a millimeter are particularly dangerous from the viewpoint of silicosis. Since they have a negative charge they can be caught by other particles which have a positive charge. These particles are produced in the purification apparatus by a very finely distributed, positively charged fog. The fog droplets catch the dust particles and all of this is precipitated on a grid.

In order to catch potentially positive particles as well, the dust first passes through a negatively charged water vapor, so that a cloud of negative drops of fog with caught-up particles is formed.

Mining engineer Birgitta Hassler, who is leader of the project, relates that the next step is to try to filter water-soluble gases and vapors. If the method in addition is suitable for warm, dust-laden air, it could become a tempting alternative to the electrofilters used today for purifying chimney smoke.

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SWEDEN

## HAZARDS OF USING COAL, OIL INSTEAD OF NUCLEAR POWER DISCUSSED

Stockholm DAGENS NYHETER in Swedish 16 Apr 77 p 4

[Article by Bo B. Melander: "Warning Against Oil and Coal; More Cancer Cases Risked"]

[Text] If nuclear power is replaced by oil and coal in 1985, air pollution would increase. The effects on people and the environment would be serious. Even today there are strong reasons to believe that burning fossile fuels (oil, gasoline) implies considerable health hazards and contributes to the incidence of lung cancer. This is stated in a report which has been drafted at the Environmental Protection Agency.

The study indicates that even today's use of energy is a hazard to health. There have been attempts to study the environmental effects in a Sweden with nuclear power in 1985 and in a Sweden without nuclear power in the same year.

If nuclear power is replaced by oil, the release of nitric oxide will be doubled, and if the emphasis is on coal rather than nuclear power the release of mercury would triple.

The investigators also believe that the risk of medical damage would increase considerably.

All the time, the investigators have proceeded from today's purification technology and the environmental problems of nuclear power have not been studied. The government's Radiation Protection Institute is doing that separately.

### Coal-Based Power Plants

If we were to build 2,000 megawatt coal-based power plants, the emissions will look like this, according to the investigators:

10,000 to 25,000 tons of sulphuric dioxide annually, 100,000 tons of nitric oxides, 10 tons of arsenic, 3 tons of cadmium, 150 tons of chromium, 5 tons of mercury and 50 tons of vanadium per year and power plant.

In an agricultural province, 50,000 hectares' worth of crops could be affected by the emissions.

There are warnings against increased mercury problems for fishing and against acidification in southern and central Sweden.

Most beneficial to the environment in 1985 would be the following, the analysts of the Environmental Protection Agency believe:

Sweden will expand nuclear power and Europe will reduce its sulphur emissions by 25 percent. Then the risks of continued acidification would decrease.

But if we were to stop nuclear power and replace it with oil at the same time as the sulphur emissions in Europe increase by 25 percent, the situation in Europe would become critical. In addition to increased death of fish, the soil would also be affected, and we would thereby get slower reforestation.

They also write about the coal-based power plants:

"This would lead to serious results in 10 to 20 years, since the accumulation of heavy metals will increase in the humus layer of the soil (the dark top layer) in quite large areas. Toward the turn of the century, the new growth of forest may deteriorate."

The amounts of waste from a 1,000 megawatt power plant are calculated to be 425,000 tons per year.

#### Improved Purification

The purification technology is developing and may reduce the emissions by 50 percent, but above all the belief is that the nineties may offer coal gasification, which reduces the emissions problems.

In conclusion, the investigators thus say:

- 1) Already today, the energy consumption poses environmental problems of great magnitude and contributes to bad health.
- 2) A greater energy consumption from fossile fuels threatens environment and health even more.

The study will be sent to the committee on energy and environment, which will present its material some time this summer. Nuclear power will then also be taken up.

"I let the investigation speak for itself," general director Walfrid Paulsson says, who points out that it is not one of the Environmental Protection Agency's own investigations.

"It was carried out by two departments at the agency on the orders of the committee on energy and environment."

From a viewpoint of environment, the study could be used as a weapon in the hands of those who advocate reduced energy consumption and greater resource conservation.

But a conclusion which might also follow is a switch to more nuclear power.

It will be the task of the committee on energy and environment to present the environmental problems and health hazards of the various sources of energy.

And to the politicians it will be a "choice between plague and cholera," if a continued increase of energy consumption is wanted with the help of the sources of energy which fit the energy apparatus of today.

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TURKEY

BRIEFS

MERCURY POLLUTION REPORTED--A report on the Izmit sewerage project, prepared by a Swiss firm "Sveco", states that the industries found in the Izmit Bay area have dumped over 10 tons of mercury into the nearby water, a situation which poses a great threat to the people in this locale who consume large quantities of fish. The report announced that fish contaminated by this mercury, when consumed, can cause sickness up to and including death, making the Izmit Bay situation extremely grave. Meanwhile, the mercury poisoning report which was distributed to the Chamber of Chemical Engineers prompted that body to request that measures be taken to prevent further damage from occurring. [Excerpts] [Istanbul POLITIKA in Turkish 27 Apr 77 p 3]

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